

REMARKS

35 U.S.C. § 102(b)

Claims 1, 2, 5, 12, 13, and 17 have been rejected under 35 U.S.C. § 102(b) as anticipated by Taylot. This rejection is respectfully traversed for the following reasons. Claims 1, 2, 5, 12, 13, and 17 have been amended above to clarify that the subject invention comprises a three-dimensional stress sensor for determining in three dimensions the direction and magnitude of a stress vector within an object body. The sensor includes a mate having a plurality of discrete lower capacitor plates surrounding and capacitively coupled to an interrogation electrode. The sensor further includes an upper conductor plate that moves under the influence of the stress forces within the body relative to the plurality of lower capacitor plates. By measuring the magnitude of capacitance changes the direction and magnitude of the stress vector in three dimensions may be ascertained.

Taylot quite simply fails to teach or suggest a three dimensional stress vector sensor. Taylot teaches a sensor in which a pad moves into more or less intimate contact with peripheral conductors to vary the electrical conductivity between the central pad and conductors by a surface piezoresistive effect. The Taylot sensor therefore operates entirely differently from the claimed invention in which a capacitance change between an interrogation electrode and surrounding capacitor plates is detected resulting from movement of a conductive plate above the capacitor plates. Contact between a pad and peripheral conductors is not used in the subject invention and is not analogous to the apparatus and method as claimed. The Taylot sensor lacks distinct advantages achieved by the present invention. Namely, Taylot requires careful calibration of contact pressure between the pad and peripheral conductors in order to equate such contact with forces within the pad. Contact pressure may vary for a number of different reasons, however. For example, the pad material may fatigue or vary in reaction from temperature or environmental factors. In short, the load to resistance calculation on which Taylot depends is inherently unreliable.

In contrast, the subject invention measures forces within an object body directly and in three dimensions through a novel arrangement of capacitively coupled system components. Forces within the object body will move the sensor upper conductive plate which will alter the capacitance between the lower capacitor plates and an interrogation electrode situated therebetween. By arranging the capacitor plates to surround the interrogation electrode, the three dimensional magnitude and direction of the stress forces may be ascertained. Taylot uses a different, and Applicant would argue inferior, sensor arrangement and mode of

operation.

There is further no teaching or suggestion in Taylot as to how or why a capacitive three dimensional sensor could be constructed and configured to provide the aforementioned advantages not achieved by Taylot. The disclosure of Taylot is totally devoid of any instruction to one skilled in the art to modify Taylot into a configuration remotely similar to that of the claimed invention. In summary, as Taylot fails to teach a three dimensional system in which a measurement of capacitive differential is equated directionally and in magnitude with stress forces within an object body, Taylot is considered totally deficient in rendering the claimed invention unpatentable.

As Taylot fails to anticipate the invention as recited in claims 1, 2, 5, 12, 13 and 17, it is respectfully requested that this rejection be withdrawn.

35 U.S.C. § 103

Claims 3, 6 and 14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Taylot in view of Mohaupt. This rejection is respectfully traversed for the following reasons. As discussed above, Taylot teaches a sensor that operatively and configuratively is entirely dissimilar from the claimed invention. The addition of Mohaupt not only does not remedy the deficiencies in the primary reference, Mohaupt points strongly supports the patentability of the claimed invention. Mohaupt teaches a capacitance weighing scale that measures weight originating from a source through bending an electrode plate of the mat over a separator, whereby varying space between electrode plates. Capacitance is altered and results and is measured. A measurement of the load is obtained by measuring change in the frequency of an interrogation oscillator.

While Mohaupt discloses in crude form the use and measurement of capacitance variation for the purpose of measuring weight imposed in one direction upon a mat, Mohaupt is not a three dimensional stress sensor. Mohaupt only measures the magnitude of normal force upon the mat and the Mohaupt sensor configuration cannot be used to detect and measure stress vectors in three dimensions. The subject invention orients capacitor plates about an interrogation electrode and capacitively coupling each plate to the electrode. As external forces from an object body move the conductive plate relative to the capacitor plates, the subject invention can resolve the magnitude and direction of stress vector components in three dimensions. The subject invention, therefore, not only has application for the limited purpose of weight measurement, as in Mohaupt, but has a multitude of other applications

where the direction and magnitude of a force vector imposed on an object body may vary and where an analysis in three dimensions of the direction and magnitude of the vector components is valuable. Mohaupt, rather than teaching the claimed invention, points to the deficiencies in prior art devices and toward patentability of the invention as claimed.

As Taylot in view of Mohaupt fails to establish *prima facie* obviousness of the invention as recited in claims 3, 6 and 14, it is respectfully requested that the rejection be withdrawn.

Allowable Subject Matter

Claims 4, 7-11, 15, 16 and 18-20 are objected to as being dependent upon a rejected base claim. Claim 4 has been amended to make terminology therein consistent with claims on which its dependency rests. Claim 4 is considered allowable as depending from claim 1 which, for the reasons set forth above, distinguishes over the cited art. Claim 7 has been amended to incorporate all of the limitations of the base claim and intervening claims. Claims 7-11 are, accordingly, in allowable form. Claims 15 and 16 have been amended to depend from claim 12 which is, for the reasons set forth above, considered by Applicant as patentably distinct over the cited art. Claim 15 recites means for comparing the sign and magnitude of capacitance changes not found in either of the cited references. Claim 16 recites that the magnitude and direction of movement of the mat upper conductive plate is ascertainable by the patterned disposition of the capacitor plates. No such configuration or capability is found in either Taylot or Mohaupt.

Claim 12 recites the subject sensor in a linear array and is considered patentable over the cited art for the same reasons set forth as regarding preceding claims. A plurality of discrete sensor components are claimed in which each sensor component comprises a plurality of lower capacitor plates disposed about and capacitively coupled to an interrogation electrode. No such sensor configuration and operation is found in the cited art.

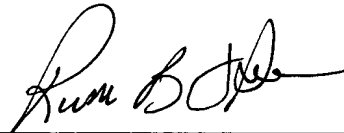
Claim 17 is amended to recite a method for measuring applied forces within an object body including a plurality of discrete lower capacitor plates capacitively coupled with and disposed in a predetermined pattern around an interrogation electrode; and means for measuring in three dimensions the applied forces within the object body by measuring changes in capacitance between the capacitor plates and the interrogation electrode. No such configuration or operation is found in the cited art.

Claim 18 has been amended to incorporate all of the limitations of its base claim and

all intervening claims. In view of the allowability of claims 18-20, claims 18-20 are considered to be in allowable form.

In light of this amendment, all of the claims now pending in the subject patent application are allowable. Thus, the Examiner is respectfully requested to allow all pending claims.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Rich B. O'Planick", written over a horizontal line.

Richard B. O'Planick – Reg. No. 29,096
Attorney for Applicants

The Goodyear Tire & Rubber Company
Department 823
1144 East Market Street
Akron, Ohio 44316-0001
Telephone: (330) 796-5240
Facsimile: (330) 796-9018